The opinion in support of the decision being entered today was ***not*** written for publication and is ***not*** binding precedent of the Board.

Paper No. 35

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex Parte ISRAEL BEINGLASS, MAHALINGAM VENKATESAN
and CHRISTIAN M. GRONET

Appeal No. 1997-4027
Application 08/300,111

HEARD: February 6, 2001

Before WARREN, WALTZ and JEFFREY T. SMITH, Administrative Patent Judges.

JEFFREY T. SMITH, Administrative Patent Judge.

Decision on appeal under 35 U.S.C. § 134

Applicants appeal the decision of the Primary Examiner finally rejecting claims 1, 3, 10 and 11. We have jurisdiction under 35 U.S.C. § 134.[1]

[1] Claims 4-9 have been withdrawn from consideration as drawn to a non-elected invention. (See paper no. 8, mailed November 10, 1993). Claim 3 on appeal was amended by an after final amendment, paper no. 28, filed August 26, 1996.

BACKGROUND

The invention is directed to a chemical vapor deposition chamber comprising susceptor support for a substrate to be processed wherein the susceptor has an extension between the support surface and the backside thereof to form a reactant gas barrier preventing reaction gases from reaching the backside surface of said susceptor.

Claim 1 which is representative of the invention is reproduced below:

> 1. In a chemical vapor deposition chamber comprising in combination
> a susceptor support for a substrate to be processed,
>
> a preheat ring surrounding said susceptor support,
>
> a plurality of external heating lamps for heating the susceptor support, the substrate thereon and the preheat ring,
>
> a source of precursor gas that provides laminar flow of the gas sequentially across the preheat ring and the substrate to an exhaust port, wherein said susceptor has an extension between the support surface and the backside thereof to form a reactant gas barrier preventing reaction gases from reaching the backside surface of said susceptor.

As evidence of obviousness, the Examiner relies on the following references:

Anderson et al. (Anderson)	5,269,847	Dec. 14, 1993
Narita	JP2-246322 (Printed Japanese Patent Application)	Oct. 2, 1990

THE REJECTION

The Examiner entered the following ground of rejection:

Claims 1, 3, 10 and 11 are rejected as being unpatentable under 35 U.S.C. § 103 over the combination of Anderson and Narita. (Examiner's Answer, page 3).

OPINION

Appellants have indicated (Brief, page 3) that, for the purposes of this appeal, the claims will stand or fall together in the following groups: Group I (claims 1 and 11), Group II (claim 3) and Group III (claim 10). Accordingly, we will select one claim from each group as representative of all of the claims on appeal from that group. See 37 CFR § 1.192(c)(7)(1995). Note ***In re King***, 801 F.2d 1324, 1325, 231 USPQ 136, 137 (Fed. Cir. 1986); ***In re Sernaker***, 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed. Cir. 1983).

Our initial inquiry is directed to the scope of the claimed subject matter. During patent prosecution, claims are to be given their broadest reasonable interpretation consistent with the specification, and the claim language is to be read in view of the specification as it would be interpreted by one of ordinary skill in the art. ***In re Morris***, 127 F.3d 1048, 1053-54, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); ***In re Zletz***, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989); ***In re Sneed***, 710 F.2d 1544,

1548, 218 USPQ 385, 388 (Fed. Cir. 1983); ***In re Okuzawa***, 537 F.2d 545, 548, 190 USPQ 464, 466 (CCPA 1976).

Claim 1 states "susceptor has an extension between the support surface and the backside thereof to form a reactant gas barrier preventing reaction gases from reaching the backside surface of said susceptor." The specification refers to the surface which supports the substrate as a pedestal or a susceptor. (Specification, page 3, lines 2-3 and page 5, lines 6-7). The specification, page 6, lines 21-23, describes the extension 142 as either built into the sidewall of the susceptor 136 or mounted on the outside thereof. Thus, the extension refers to the portion of the susceptor or pedestal which is not covered by the substrate. (See Figure 2). The extension can also be described as the portion of the susceptor 136 not covered by the substrate 135 that extends outward toward the surrounding heat ring 140. The description of the extension in claim 1 is not limited to the shape of 142 described in Figure 3.

It is well established that the examiner has the initial burden under § 103 to establish a ***prima facie*** case of obviousness. ***In re Oetiker***, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); ***In re Piasecki***, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). To that end, the examiner must show that some objective teaching or suggestion in the applied prior art, or knowledge generally available in the art would have led one of ordinary skill in the art to arrive at the claimed

invention. ***Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc***., 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1630 (Fed. Cir. 1996).

All of the appealed claims stand rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Anderson and Narita.

Upon careful review of the entire record including the respective positions advanced by Appellants and the Examiner, we find that the Examiner has carried his burden of establishing a ***prima facie*** case of obviousness for the subject matter of claims 1 and 10. This ***prima facie*** case has not been effectively rebutted by Appellants.

There is no dispute that Anderson, like claim 1, discloses a chemical vapor deposition chamber comprising susceptor support for a substrate to be processed, a preheat ring surrounding said susceptor support, a plurality of external heating lamps for heating the susceptor support, the substrate thereon and the preheat ring, a source of precursor gas that provides laminar flow of gas sequentially across the preheat ring and the substrate to an exhaust port. Appellants urge Anderson differs

from claim 1 in that claim 1 requires that the susceptor has an extension between the support surface and the backside thereof to form a reactant gas barrier preventing reaction gases from reaching the backside surface of said susceptor. (Brief, page 4, second paragraph).

As stated above, in claim 1, the extension between the support surface and the backside thereof refers to the portion of the susceptor not covered by the substrate that extends outward toward the surrounding heat ring. Anderson discloses a pedestal (15) which has a portion of the pedestal not covered by the substrate (16) that extends outward toward the surrounding heat ring (36). (See Figure 3). Anderson discloses it is important to control the distribution of gases across the wafer. Consequently, Anderson discloses the vapor deposition chamber should have small spacing between the gas inlet port and the nearest edge of the wafer as well as the exhaust port and the nearest edge of the wafer. (Column 2, lines 1-10). Anderson also discloses it is important to prevent reactant gases from flowing to the backside of the reaction chamber. (Column 4, lines 5-9). To solve this problem, nitrogen or hydrogen gas is added to the bottom of the reaction chamber to prevent the reactant gases from flowing to the backside of the reaction chamber through the space between the pedestal and the preheat ring. One of

ordinary skill in the art would have been motivated to form the reaction chamber of Anderson which contains very little spacing between the pedestal and the surrounding preheat ring in order to (1) control the distribution of gases across the wafer, (2) prevent the reactant gases from flowing to the backside of the reaction chamber and (3) prevent the dilution of the reactant gases by the gases which are added to the bottom of the reaction chamber.[2]

Claim 10 adds the following limitation to claim 1: "including a means for rotating said susceptor support." When the terms in the claims are written in a "means-plus-function" format we interpret them as the corresponding structure shown in the specification or equivalents thereof consistent with 35 U.S.C. § 112, paragraph 6. ***In re Donaldson***, 16 F.3d 1189, 1193, 29 USPQ2d 1845, 1848 (Fed. Cir. 1994). Nowhere does claim 10 recite sufficient structural limitations for the

[2] We recognize that the ultimate way to prevent the flow of reactive gases to the backside of the reaction chamber is to eliminate the space between the pedestal and the preheat ring. It is also noted that Anderson's preferred embodiment calls for the rotation of the pedestal. The purpose of rotating the substrate is to improve the uniformity of the time averaged physical and chemical environment of the wafer during processing. (Column 1, lines 43-47). One of ordinary skill in the art who did not desire the improvements associated with a rotating pedestal would have been motivated to exclude the rotating pedestal from the reaction chamber of Anderson. See ***In re Larson***, 340 F.2d 965, 969, 144 USPQ 347, 350 (CCPA 1965) (Omission of additional framework and axle which served to increase the cargo carrying capacity of prior art mobile fluid carrying unit would have been obvious if this feature was not desired.); and ***In re Kuhle***, 526 F.2d 553, 555, 188 USPQ 7, 9 (CCPA 1975) (deleting a prior art switch member and thereby eliminating its function was an obvious expedient).

rotating means. Thus, we look to the specification for the structure corresponding to "means for rotating" and equivalents thereof to determine the scope and meaning of claim 10.

We interpret the claimed "means for rotating" as a motor known in the prior art chemical vapor deposition chamber illustrated in figure 1 and described at page 2, line 19 to page 3, line 5, of the specification.[3] According to the specification figure 1 is representative of a deposition chamber of the prior art. (Specification, page 5, lines 24-25). The specification discloses the pedestal or susceptor is rotated by a motor 37. (Specification, page 3, lines 2-5).

Anderson discloses the wafer, which is located on the pedestal, should be rotated to increase the uniformity of the processing. (Column 1, lines 43-47). Anderson does not describe the motor used to rotate the pedestal. Appellants have not asserted that the means for rotating of claim 10 is different from the prior art. Thus, we hold that the means for rotating described in the prior art is the same in both Anderson and the claimed invention.

Claim 3 adds the following limitations to the subject matter of claim 1: "wherein said preheat ring has an extension in its upper surface that overlaps and mates with said

[3] We note the figure 2, which is representative of the Appellants' invention, includes a component 137 which is not described in the specification. We presume component 137 is also representative of a motor for rotating the susceptor.

susceptor extension." The Examiner relies on Narita to describe a preheat ring that has an extension in its upper surface that overlaps and mates with a susceptor that has an extension. We agree with Appellants' description of Narita appearing on pages 4 and 5 of the Brief. Narita does not describe the same type of preheat ring as Anderson. The preheat ring of Anderson, like the claimed invention, is used to heat the reactive gases prior to deposition. The preheat ring (susceptor 7) of Narita is used to thermally heat the susceptor 8 prior to deposition. The present record does not contain adequate motivation for substituting the susceptor and thermal preheat susceptor of Narita for the susceptor and gas preheat ring of Anderson. In the absence of sufficient factual evidence or scientific rationale on the part of the Examiner to establish why and how a skilled artisan would have arrived at the subject matter of claim 3 from the applied references, we find that the Examiner has failed to meet the initial burden of establishing the ***prima facie*** obviousness of the claimed subject matter. Accordingly, we are constrained to reverse the Examiner*s rejection of claim 3.

CONCLUSION

The rejection of claims 1, 10 and 11 as being unpatentable under 35 U.S.C. § 103 over the combination of Anderson and Narita is affirmed.

The rejection of claim 3 as being unpatentable under 35 U.S.C. § 103 over the combination of Anderson and Narita is reversed.

Time for taking action

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

CHARLES F. WARREN Administrative Patent Judge	)
THOMAS A. WALTZ Administrative Patent Judge	) BOARD OF PATENT) APPEALS AND) INTERFERENCES
JEFFREY T. SMITH Administrative Patent Judge	)

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